



Alabama Department of Environmental Management  
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November 14, 2019

Mr. Dustin Brooks, P.G.  
Land Compliance Supervisor  
Environmental Affairs  
Alabama Power Company  
600 North 18<sup>th</sup> Street – 12N-0831  
Birmingham, Alabama 35203

RE: **Response to CCR Documents Submitted to the Department**  
Alabama Power Company

Dear Mr. Brooks:

The Solid Waste Branch has reviewed documents submitted to the Department for the James M. Barry Electric Generating Plant, the James H. Miller, Jr. Electric Generating Plant, the E.C. Gaston Electric Generating Plant, Greene County Electric Generating Plant, and the William C. Gorgas Electric Generating Plant. Please note that Plant Gadsden is not included as part of this review. These documents include Groundwater Monitoring Plans submitted as part of the permit applications, the 2018 Annual Groundwater Monitoring and Corrective Action Reports, Responses to ADEM Comments on the Groundwater Investigation Reports, Alternate Source Demonstrations, Assessments of Corrective Measures, the 2019 Semi-annual Groundwater Monitoring and Corrective Action Reports and Phase II Groundwater Delineation Plans.

As a result of the review of the above referenced documents, the Department has compiled comments and/or recommendations that are included for your review. The Department hereby requests that the Alabama Power Company submit a response addressing the comments within 45 days of receipt of this letter. If you have any questions regarding this matter, please contact the undersigned at (334) 271-7849.

Sincerely,

A handwritten signature in black ink that reads "Heather M. Jones".

Heather M. Jones, Chief  
Compliance and Enforcement Section  
Solid Waste Branch

Enclosure



**RESPONSE TO DOCUMENTS SUBMITTED TO THE DEPARTMENT IN ACCORDANCE  
WITH ADEM ADMIN. CODE 335-13-15 AND ADMINISTRATIVE ORDERS  
NOVEMBER 2019**

**Alabama Power Company (APCO)**

James M. Barry Electric Generating Plant, James H. Miller, Jr. Electric Generating Plant, E.C. Gaston  
Electric Generating Plant, Greene County Electric Generating Plant, and William C. Gorgas Electric  
Generating Plant

**Documents Submitted and Reviewed**

Groundwater Monitoring Plan  
2018 Annual Groundwater Monitoring and Corrective Action Report  
Response to ADEM comments on the Groundwater Investigation Report  
Alternate Source Demonstrations  
Assessments of Corrective Measures  
2019 Semi-annual Groundwater Monitoring and Corrective Action Reports  
Phase II Groundwater Delineation Plans

The documents referenced above have been submitted to the Department for each of the subject facilities in order to comply with provisions of ADEM Admin. Code ch. 335-13-15 and the Administrative Orders issued to APCO in August of 2018. The Department has reviewed the documents and as a result of that review, the Department offers the following comments. Comments for a specific facility and/or unit are identified as such.

**GROUNDWATER MONITORING PLAN**

The Groundwater Monitoring Plans (GWMPs) for each of the subject facilities were received by the Department on December 5, 2018.

**General Comments**

ADEM Admin. Code r. 335-13-15-.03(1)(a)2. requires two groundwater measurements to be taken during each of the three consecutive months of February, March, and April with no two measurements taken within any twelve day period. Groundwater elevation has been measured at several different times in different borings as they were installed. However, since the installation of all borings and groundwater monitoring wells, **it does not appear that a comprehensive water level gauging has been conducted in the months of February, March, and April as required by the regulations.**

ADEM Admin Code r. 335-13-15-.03(1)(a)1. requires that the hydrogeological evaluation include geologic logging, with these borings completed as piezometers. **Boring logs were not submitted as part of the GWMPs.** A description of the depth and construction, along with additional cross sections of the borings, are requested for each CCR unit.

Several figures, in both the GWMPs and other documents, show additional groundwater wells than those listed as compliance wells in the GWMP. Please clarify whether these wells are to be part of the monitoring network or are they merely for delineation/assessment purposes.

Additional wells may be needed at Plant Miller Ash Pond due to large spacing between MW-11 and MW-12 locations.

**Background Monitoring Wells**

The GWMPs should include background wells that accurately represent groundwater quality and that has not been affected by the CCR unit(s). The addition or relocation of background wells may be needed to determine background and adequately represent groundwater quality passing the waste boundary. Please include justifications for the background wells proposed for each of the groundwater monitoring networks.

The GWMPs should provide more information regarding how background data will be handled. The update should include a discussion on whether background data is pooled for sites with multiple background monitoring wells and a description of how background data will be updated as wells are added or removed from the network.

#### Statistical Analysis

Several of the GWMPs state that intrawell statistical analysis may be selected based on spatial variation between background well locations. It is noted that many of the compliance locations have been historically impacted from CCR unit(s). Typically, the use of the intrawell method for statistical analysis is precluded when a groundwater well has been impacted. With this in mind, please submit justification for appropriate statistical analysis for each CCR unit.

ADEM Administrative Code r. 335-13-15-.06(3)(f) requires that the owner or operator of a CCR unit specify in writing the statistical method to be used in evaluating groundwater data. In accordance with this rule, the Department requests the following information as it pertains to statistical analysis:

- The GWMPs should provide adequate justification for the statistical adjustments outlined in Sections 2.3 and 2.6 of the Statistical Analysis Plan. Additionally, when statistical adjustments are made, please include in the report what adjustments are used and why.
- The GWMPs should specify that a power curve will be provided with semiannual groundwater monitoring reports.
- Please indicate in the GWMPs that the Department will be notified within 14 days of detecting a statistically significant increase over background (when in detection monitoring) or the groundwater protection standard (when in assessment monitoring) per ADEM Admin. Code r. 335-13-15-.06(4)(h)3.

#### **2018 ANNUAL GROUNDWATER MONITORING & CORRECTIVE ACTION REPORTS**

The 2018 Annual Groundwater Monitoring and Corrective Action Report (GWMR) for each of the subject facilities was received by the Department on February 27, 2019.

The GWMRs suggest that the background data sets were combined to form a pooled background data set for the statistical evaluation of Appendix IV parameters. The Groundwater Monitoring Plan provides the Analysis of Variance (ANOVA) used to statistically evaluate differences in average concentrations among upgradient wells for Appendix III parameters; however, no such analysis has been provided for the Appendix IV parameters. The Department requests that APCO submit the statistical analysis used to determine non-significance between the background data sets for Appendix IV parameters.

In many cases, site-specific groundwater protection standards (GWPS) have been established for one or more constituent based on upgradient concentrations. However, APCO specifically requested, in a letter dated March 4, 2019, a variance from the requirements of ADEM Admin. Code r. 335-13-15-.06(6)(h)2., which would require the facility to use background concentrations for those constituents for which a maximum contaminant level (MCL) had not been established. In addition, APCO requested GWPSs of 6 µg/L for cobalt; 15 µg/L for lead; 40 µg/L for lithium; and 100 µg/L for molybdenum. On April 15, 2019, the Department approved the variance requests. While the Department recognizes that ADEM Admin. Code r. 335-13-15-.06(6)(h)2. allows for the use of the background concentration

for each constituent, the variance request specifically exempted APCO from this requirement. The Department requests that APCO clarify their intent as it pertains to groundwater protection standards at the facility. It should also be noted that in several instances reports incorrectly state that the standards requested in the variance were used, when after a review of the data, it is clear that site-specific GWPSs were used.

In all cases where a site-specific GWPS was used, the GWPS was updated after each sampling event. Chapter 5 of the US EPA *Statistical Analysis of Groundwater Monitoring at RCRA Facilities* (Unified Guidance) recommends that background be updated every 2-3 years and only after a statistical comparison between existing background and a potential set of new data to determine if there is significance between the two sets of data, whether using interwell or intrawell analysis. The Unified Guidance further states that “adding individual observations to background can introduce subtle trends that might go undetected”. As noted previously, the Department requests that the procedure for updating background be included in the revised GWMP.

There are numerous instances (as detailed below) where background wells appear to change or are misidentified. Please be advised that the reassignment of a downgradient well to an upgradient well, and vice versa, should be approved by the Department prior to the change. Also, when such a change is necessary, APCO should provide information on how historical background data will be used once a new upgradient well is established.

- Section 4.1 of the Plant Gaston Ash Pond GWMR identifies monitoring wells GN-AP-MW-1 through 3 as upgradient wells. However, Table 1 of the Report identifies monitoring wells GN-AP-MW-1 through 4 as upgradient wells.
- Section 4.1 of the Plant Gorgas Ash Pond GWMR identifies monitoring wells GS-AP-MW-8 and 13 as upgradient wells. However, Table 1 of the Report identifies monitoring well GS-AP-MW-12 as an upgradient well.
- The Plant Miller Ash Pond GWMR, as well as various other reports, identify monitoring wells MR-AP-MW-9S, MR-AP-MW-13S, GS-AP-MW-8 and GS-AP-MW-13 as upgradient wells. The response to ADEM comments on the Groundwater Investigation Report, as well as the 2019 Semi-annual Groundwater Monitoring and Corrective Action Report, indicate that monitoring wells MR-AP-MW-9S and MR-AP-MW-13S have been re-designated, by the facility, as downgradient wells. It should also be noted that monitoring wells GS-AP-MW-8 and GS-AP-MW-13 are wells located at the Plant Gorgas Ash Pond several miles away and these locations have not been approved as background locations for either plant.
- The Plant Greene GWMP identifies monitoring wells GC-AP-MW-11, 12, 23, 24 and 26-33 as upgradient wells. However, the 2018 GWMR and the 2019 Semi-annual GWMR identify wells GC-AP-MW-11, 12, and 31-33 as downgradient wells with little or no explanation for the change.

To reiterate, the addition or removal of monitoring wells as part of the GWMP, requires sufficient evidence to support the change, as well as approval by the Department. In the absence of this approval, or until such approval is granted, the monitoring wells designated in the GWMPs will be used for compliance determinations.

The Plant Barry Gypsum Pond GWMR classified BY-GSA-PZ-11 as a piezometer used in measuring the groundwater elevations at the facility. Because BY-GSA-PZ-11 is the only monitoring well providing coverage downgradient of the Gypsum Pond, the Department requests that the classification of BY-GSA-PZ-11 be revised to a downgradient monitoring well and for statistical analysis of the well data to begin once adequate background (4-8 samples) has been obtained. Furthermore, the Plant Barry Gypsum Pond Groundwater Monitoring Plan will need to be modified to reflect this change.

Monitoring wells MW 1-4 are used as upgradient wells for the Plant Gorgas CCR Landfill, Gypsum Pond, Bottom Ash Landfill and Gypsum Landfill. Table 5 of the GWMRs provides a summary of background concentrations and groundwater protection standards. However, different background values are reported for cobalt and lithium. The Department requests justification for the different reported concentrations given that the units utilize the same background wells. The background concentrations for cobalt and lithium for each of the units are summarized in the table below.

Unit	Cobalt		Lithium	
	May 2018	Nov 2018	May 2018	Nov 2018
CCR Landfill	0.347	0.386	0.237	0.323
Gypsum Pond	0.738	0.49	0.237	0.2764
Gypsum Landfill *	0.3635	0.3753	0.237	0.323
Bottom Ash Landfill	0.347	0.7643	0.237	0.323

\*The Gypsum Landfill has three additional upgradient wells.

In the Plant Gaston Ash Pond GWMR, GN-AP-MW-1 is identified as an upgradient well. However, due to groundwater flow directions depicted in Figure 4 of the report, the Department requests additional information to justify utilizing GN-AP-MW-1 for determining background. Furthermore, additional wells are needed at the site to adequately determine background groundwater quality.

It appears that the reporting limits for select constituents are higher than the lowest concentration that is consistently attained by other analytical laboratories and were generally higher than the associated GWPS. It is recommended that APCO evaluate the reporting limits to ensure appropriate reporting limits are being utilized.

The Department requests that future groundwater reports include the information outlined in the March 2011 Alabama Groundwater Monitoring Reporting guidance found at [www.adem.state.al.us/programs/land/landforms/ALGWMonitoringReportGuidanceMarch2011](http://www.adem.state.al.us/programs/land/landforms/ALGWMonitoringReportGuidanceMarch2011). This includes, but is not limited to, historical background data, a summary table of all detections for all constituents for a given monitoring event, and documentation of field sampling parameters. In addition, the Department requests a CD to include all tables, figures and statistical analysis for easier viewing.

#### **RESPONSE TO ADEM COMMENTS ON THE GROUNDWATER INVESTIGATION REPORTS**

The Department submitted comments dated June 20, 2019, to APCO on the May 13, 2019, Groundwater Investigation Report for each of the subject facilities. Responses to comments that are not specifically addressed here were considered adequate.

The response to ADEM comments for the Plant Barry Ash Pond indicates that horizontal delineation wells BY-AP-MW-17H and BY-AP-MW-23H will be utilized to horizontally delineate potential impacts from BY-AP-MW-17 and BY-AP-MW-5, respectively. It should be noted that BY-AP-MW-23H is not depicted in Figure 1 of the revised Groundwater Investigation Progress Report. Also, BY-AP-MW-17H is approximately 1,750ft to 2,500ft from either well. Given the estimated groundwater flow velocity of 3 feet/year, it would take approximately 580 to 880 years to reach BY-AP-MW-17H from either well. This does not appear to be sufficient for delineation purposes. In addition, no further delineation is proposed in the vicinity of BY-AP-MW-1 because groundwater flow primarily flows toward the ash pond and the well appears to be screened in a perched zone. Insufficient information has been provided to verify either claim. Considering the highest detections of arsenic at Plant Barry are from monitoring well BY-AP-MW-1, the Department requests additional information justifying APCO's proposal not to delineate arsenic impacts around BY-AP-MW-1. APCO should address the possibility that there is a mounding effect around the edges of the pond (at Plant Barry and the other facilities), which may be contributing to the arsenic concentrations. Lastly, the response indicates that

further data will be collected (and reported to ADEM by September 30, 2019) to explore the source of lithium detected above the GWPS in well BY-AP-MW-7V. To date, the additional data/information has not been submitted to the Department.

Despite the APCO's response, it does not appear that full delineation of the Plant Gorgas Bottom Ash Landfill has occurred. No horizontal delineation wells and only one vertical delineation well has been installed at the facility. Please provide rationale for the limited placement of monitoring wells at the site.

At select sites, well locations where there was a lack of groundwater yield were considered successfully delineated as the lack of groundwater yield seems to indicate lack of groundwater and contaminant migration. APCO should provide data obtained from further sampling attempts or the installation of additional wells in the vicinity of the well locations in question in order to confirm this claim.

**Additional delineation is necessary at all the referenced facilities.** The Department recognizes that the deadlines laid out in ADEM Admin. Code ch. 335-13-15 and the Administrative Orders provided little room for multiple well installation events or weather related obstacles. However, the intent of the investigation, as stated in ADEM Admin. Code r. 335-13-15-.06(6)(g)2., is that the nature and extent of contamination must be sufficient to support a complete and accurate assessment of corrective measures. Without having the plume fully delineated or having an understanding of any possible trends in the contaminant concentrations, selection of the proposed remedy seems premature and based off insufficient data.

The Department requests that APCO provide a detailed map, such as a chloropleth map, to better illustrate the horizontal extent of contamination at the subject facilities.

## **ALTERNATE SOURCE DEMONSTRATIONS**

### **Plant Gaston Ash Pond**

A partial alternate source demonstration (ASD) for combined radium 226+228 in monitoring well GN-AP-MW-20 was submitted to the Department as Appendix C of the 2018 Annual Groundwater Monitoring and Corrective Action Report on February 27, 2019. While the Department agrees the radium detections may be naturally occurring, additional data and/or documentation is needed to definitively determine the source of the radium at the site.

### **Plant Gorgas Bottom Ash Landfill**

An ASD for arsenic and lithium in monitoring wells MW-12 and MW-12V, respectively, at the Plant Gorgas Bottom Ash Landfill was submitted to the Department on July 1, 2019.

- The ASD states that arsenic occurs naturally in pyrite contained within mudstones and coal seams of the Pottsville Formation. Furthermore, the ASD claims that arsenic detections above the GWPS are isolated to MW-12. The Department has determined that insufficient information has been submitted to demonstrate that arsenic is not from the unit, especially considering the elevated levels of arsenic detected in this well.
- The ASD states that the statistically significant level (SSL) for lithium in MW-12V was the result of a statistical evaluation error. Specifically, the ASD claims lithium was not compared to the most recently updated site-specific GWPS. When compared to the latest background derived GWPS, lithium did not exceed the standard. As discussed above, the Unified Guidance recommends that background not be updated after each sampling event, but rather after several events and after a statistical evaluation to ensure there are no trends in the background data. Furthermore, the Department has not approved the proposed background wells used for the establishment of the site-specific standards.

### Plant Gorgas CCR Landfill

An ASD for lithium in monitoring well MW-6 was submitted to the Department as Appendix C of the 2018 Annual Groundwater Monitoring and Corrective Action Report on February 27, 2019. The ASD states that lithium concentrations were due to natural groundwater variation at the location related to the presence of mine spoils at the site. However, monitoring well MW-6 is located side-gradient to the Plant Gorgas Bottom Ash Landfill. APCO should provide additional information demonstrating that the SSL for lithium was not due to impacts from the Bottom Ash Landfill.

### Plant Gorgas CCR/Gypsum Landfills

An ASD for lithium in monitoring well MW-20 was submitted to the Department as Appendix C of the 2018 Annual Groundwater Monitoring and Corrective Action Report on February 27, 2019. The ASD states that during the May 2018 sampling event, lithium was detected at a SSL above the GWPS in well MW-20. However, no SSLs were identified for any constituent during the November 2018 sampling event. The ASD further stated waste has not been placed in the Gypsum Landfill and therefore a release from the unit cannot be the cause of the SSL for lithium. As such, the detection was attributed to an error in sampling, error in analysis, or natural variation in groundwater quality. Because monitoring well MW-20 is downgradient of the Plant Gorgas Bottom Ash Landfill, APCO should provide additional information demonstrating that the lithium SSL was not due to impacts from the Bottom Ash Landfill.

Please be advised, in accordance with ADEM Admin. Code r. 335-13-15-.06(6)(g)4.(ii), ASDs must be approved by the Department. If a successful demonstration has not been made within 90 days of finding that an Appendix IV constituent has been detected at a SSL over the groundwater protection standard, then APCO must initiate an assessment of corrective measures.

### ASSESSMENT OF CORRECTIVE MEASURES

The Assessment of Corrective Measures (ACM) for the Plant Barry Ash Pond, Plant Miller Ash Pond, Plant Greene County Ash Pond, Plant Gaston Ash Pond, Plant Gorgas Ash Pond and the Plant Gorgas Gypsum Pond were received by the Department on July 11, 2019.

ADEM Admin. Code r. 335-13-15-.06(8) contains substantial requirements that must be evaluated when selecting a remedy, such as the long- and short-term effectiveness and protectiveness of the potential remedy, the effectiveness of the remedy in controlling the source to reduce further releases, among many others. **The ACMs submitted by APCO do not meet the level of detail required in the regulations.** Please update the ACMs to include detailed information for each requirement of this section. Furthermore, ADEM Admin. Code r. 335-13-15-.06(8)(b)3. and (b)4. require that the **remedy must (1) “control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV into the environment” and (2) “remove from the environment as much of the contaminated material that was released from the CCR unit as feasible...”**. The ACMs evaluate a number of options, with source control (by consolidating and capping the CCR units) and monitored natural attenuation (MNA) proposed as the most effective remedy. **The Department requests a more detailed justification for the proposed remedies given that source control will not be achieved for an average of 10 years and that no other mechanism is proposed to reduce the potential for further releases to the “maximum extent feasible”**.

In a 1999 OWSER Directive (*Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*), EPA states that “it is necessary to know what specific mechanism (type of sorption or redox reaction) is responsible for the attenuation of inorganics so that the stability of the mechanism can be evaluated” when using MNA as a corrective action. Furthermore, in EPA guidance (*Monitored Natural Attenuation of Inorganic Contaminants in Groundwater, Vol. 1*) a four tiered evaluation approach is recommended. In this approach, it must be determined if the plume

is stabilized or decreasing, what specific attenuation mechanism is responsible for attenuation at the site, whether the mechanism is reversible over time and whether the aquifer has sufficient capacity for the necessary attenuation mechanism. Lastly, the evaluation should include how the remediation will be monitored and what actions (and when) will be taken when the attenuation is insufficient. **No such evaluation was provided or proposed in the submitted ACMs.** Additionally, MNA is not appropriate in certain environments (karst terrains), for certain constituents (inorganics), and requires the aquifer have sufficient capacity for attenuation to take place. The Department requests a more detailed evaluation of the effectiveness of MNA, or any other proposed remedy, based on site specific conditions.

The ACMs state that an adaptive site management process will be utilized to determine if additional technologies will be used to supplement the proposed remedy (source control and MNA) if corrective action goals are not being met. **However, the ACMs do not give specific trigger points or timeframes that will be used to determine if changes need to be made to the corrective action program.** Furthermore, if adaptive management is triggered, there is no discussion on what steps may be employed and in what order. Therefore, the Department recommends that APCO re-evaluate the proposal and provide more detail on the adaptive management process including triggering scenarios/events, benchmarks, and timeframes for evaluation and implementation of alternate corrective actions.

Additionally, as stated previously, it is the Department's position that any final decision regarding corrective measures at the sites is premature, considering the Department's contention that the extent of contamination at each of the sites has yet to be fully delineated.

#### **2019 SEMI-ANNUAL GROUNDWATER MONITORING & CORRECTIVE ACTION REPORTS**

The 2019 Semi-annual Groundwater Monitoring and Corrective Action Report (GWMR) for each of the subject facilities was received by the Department on July 31, 2019. In general, **many of the comments or concerns identified with the 2018 Annual Groundwater Monitoring and Corrective Action Reports still need to be addressed.** Additionally, the 2019 Semi-annual GWMRs fail to include data from delineation wells, giving the appearance that these wells were not sampled during the semi-annual monitoring event. The Department requests clarification on the failure to collect data from these wells (or failure to report the data if samples were collected).

#### **PHASE II GROUNDWATER DELINEATION PLANS**

In response to Departmental comments sent regarding the Groundwater Investigation Report (dated June 20, 2019) APCO submitted Phase II Groundwater Delineation Plans for the Plant Miller Ash Pond, Plant Gaston Ash Pond, Plant Gorgas Ash Pond and the Plant Gorgas Gypsum Pond, that were received by the Department on August 15, 2019. The revised delineation plans have been reviewed by the Department and were considered adequate.